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REMARKS

This Response is intended as a full and complete response to the Office Action dated April 14, 2004. In view of the following discussion, the Applicants believe that all claims are now in allowable form.

CLAIM AMENDMENTS

Claim 11 has been amended to correct a clerical error substituting the word "supply" for "source." The Applicants submit that this amendment was made for reasons unrelated to patentability and that no new matter has been added.

CLAIM REJECTIONS

35 U.S.C. §103 Claims 1-10

Claims 1-10 stand rejected as being unpatentable over United States Patent No. 5,151,871, issued to *Matsumura, et al.* (hereinafter referred to as "*Matsumura*"), in view of *Tamura, et al.* (U.S. 4,549,073) or *Orosy, et al.* (U.S. 3,789,190) and *Carroll* (U.S. 4,795,884). Applicants respectfully disagree.

Independent claim 1 recites limitations not taught or suggested by the cited references, alone or in combination. As the Examiner concedes, *Matsumura* does not disclose a meter coupled to a heater electrode or a controller coupled to the meter and a power source, wherein the controller regulates power distribution to the heater electrode via the power source based upon the temperature of the heater electrode, as recited in claim 1.

Tamura teaches a current controller for resistive heating element that measures the resistance of a heating element and compares it to a pre-determined value in order to derive a temperature value. (See *Tamura*, Col. 1, lines 36-68). *Orosy* teaches a temperature regulator for an electrical heater that functions by sensing the resistance of the heating element, which results in an electrical imbalance to a wheatstone bridge. Lastly, *Carroll* discloses using platinum resistance thermometers to obtain temperature measurements. Specifically, *Carroll* discloses coupling a voltmeter and ammeter to the platinum resistance thermometer, measuring the voltage and amperage across the

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platinum resistance thermometer and calculating the temperature of the platinum resistance thermometer. (See *Carroll*, Col. 1, lines 12-18, Col. 3, lines 29-59, and Col. 4, lines 31-35).

However, there is no suggestion or motivation in the references themselves, nor in the prior art, to combine the references in the manner indicated by the Examiner. Specifically, *Matsumura* teaches detecting the temperature of an object (W) to be processed either directly or indirectly, and, as depicted in Figure 5A, utilizes a thermometer (24) and a sensor (25) to accomplish this task. Furthermore, *Matsumura* teaches and suggests connecting two electrodes (15, 16) on an outer periphery of the substrate support (12) and coupled to a conductive thin film (14). The sensor (25) of the thermometer (24) is positioned beneath the object (W) and proximate the film (14). See, *Matsumura*, Fig. 5A and accompanying text. As such, the position of the electrodes (15, 16) along the outer periphery makes the measurement of the electrode temperature inaccurate for sensing the temperature of the object (W) spaced laterally inward of the electrodes (15, 16). Thus, using the electrodes to sense temperature in the structure of *Matsumura* would not be in accordance with the teachings of *Matsumura* to accurately detect the temperature of the object (W) to be processed.

Moreover, the Applicants have submitted herewith an affidavit in support of non-obviousness, executed by Dr. Arnold Kholodenko, to provide extrinsic evidence of the patentability of claims 1-20 over the cited references. In summary, Dr. Kholodenko asserts that the invention provides a significant unexpected advantage over the prior art. Specifically, it was unexpected that the temperature control apparatus of the present invention would have improved process control due to reduced chamber ground leakage through wiring disposed in the pedestal (substrate support). The reduction in ground leakage increases processing performance and enables processes having critical dimensions to be processed more predictably with greater wafer to wafer uniformity.

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The present invention further provides a significant number of additional advantages, such as use of existing parts, reduction in parts, increased usable area of the pedestal for wiring and/or routing of other components, increased reliability, reduced complexity of operation and assembly, reduced costs of fabrication and operation, and other advantages as more specifically described in the attached affidavit.

As such, the Applicants submit that independent claim 1, and claims 2-10 depending therefrom are not obvious under 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicants respectfully request that the rejections be withdrawn and the claims allowed.

B. Claims 11-20

Claims 11-20 stand rejected as being unpatentable over *Matsumura* in view of *Tamura* or *Orosy* and *Carroll* as applied to claims 1-10 above, and in further view of United States Patent Application 5,280,156 issued to *Niori, et al.* (hereinafter referred to as *Niori*). The Applicants respectfully disagree.

Claim 11 recites limitations not taught or suggested by the cited references, alone or in combination. As discussed above, *Matsumura* in view of *Tamura* or *Orosy* and *Carroll* fails to teach or suggest a meter coupled to a second lead of a heater electrode and a power supply for measuring a characteristic of the heater electrode as an indicator of temperature of the heater electrode, and a controller coupled to said meter and said power source, wherein said controller regulates power distribution to said heater electrode, via said power source, based upon a temperature of said heater electrode, where the temperature is determined from a measured resistivity of the heater electrode, as recited in claim 11.

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Niori discloses a wafer heating apparatus comprising a heat generating resistive element disposed within a ceramic substrate disk. (See, *Niori*, Col. 4, lines 11-27). However, *Niori* fails to teach or suggest a meter coupled to a heater electrode and a power supply for measuring a characteristic of the heater electrode as an indicator of temperature of the heater electrode, and a controller coupled to said meter and said power supply, wherein said controller regulates power distribution to said heater electrode, via said power source, based upon a temperature of said heater electrode, where the temperature is determined from a measured resistivity of the heater electrode, as recited in claim 11. In fact, *Niori* is completely devoid of any teaching or suggestion of measuring the temperature of the substrate support in any manner. Therefore, the teachings of *Niori* may not be used to modify the teachings of *Matsumura*, in view of *Tamura* or *Orosy*, and further in view of *Carroll*. Moreover, as discussed above in the affidavit of Dr. Kholodenko, there are significant unexpected advantages over the prior art which result from the use of the present invention which provide extrinsic evidence of non-obviousness.

As such, the Applicants submit that independent claim 11, and claims 12-20 depending therefrom are not obvious under 35 U.S.C. §103 and are patentable thereunder. Therefore, the Applicants respectfully request that the rejections be withdrawn and the claims allowed.

CONCLUSION

Thus, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both reconsideration of this application and swift passage to issue are earnestly solicited.

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If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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